

## **Hassayampa Landfill**

### **EPA National Priorities List (NPL) Site**

#### **Boundaries:**

The Hassayampa Landfill Site (Site) is located about ten miles west of Buckeye, Arizona, and approximately six miles east of the Palo Verde Nuclear Generating Station. The Site consists of about ten acres formerly used for hazardous waste disposal which lies adjacent to the 47-acre former sanitary landfill.

#### **Site Status Update:**

The soil vapor extraction system (SVE) was restarted in March 2006. SVE construction and startup testing activities included the construction of a high density polyethylene lined equipment containment pad, installation of a proprietary vapor compression/condensation treatment unit (owned and operated by GEO Inc.) and transmission piping from 11 fine-grained zone vapor wells to the treatment unit. Soil vapor monitoring probe VP-19UA was connected to the SVE system in December 2006. As of the end of the third quarter 2007, a total of approximately 4,400 gallons or 48,500 pounds of waste solvent have been recovered and properly disposed.

Prior to the re-start of the SVE system, nine soil borings were drilled in January and February 2006 to further characterize the subsurface conditions in the vicinity of the primary source area at the Site, the former solvent disposal pit (Pit 1). The data collected during that effort helped to focus the operation of the SVE system when it was re-started and further the development of the Site Conceptual Model regarding fate and transport of chemicals.

Two monitoring wells (MW-18UA, MW-19UA) and a piezometer (MW-20UA) were installed and added to the groundwater monitoring program in 2006. The groundwater recovery system, installed in 1994, pumps and treats approximately 2,700,000 gallons of groundwater per year. Between March 2006 and the end of the Third Quarter 2007, the groundwater recovery system has removed and treated approximately 60 pounds of volatile organic compounds (VOCs). The 2006 annual monitoring report was approved and finalized in October 2007.

The Hassayampa Steering Committee (HSC) submitted a Phase I Report to EPA and ADEQ in June 2007. The Phase I work completed in 2006 and early 2007 was designed to collect supplemental data for addressing remaining data gaps and resume control of the soil vapor plume. Specific Phase I work included soil boring investigations, groundwater well installations, aquifer tests and the re-start of the SVE system. The Phase I Report also included interpretations of the current state of the Site, in particular the soil vapor and groundwater plumes. The Phase I Report is currently under review by EPA and ADEQ and is expected to be finalized by the end of 2007.

Routine monitoring is on-going to collect supplemental data for use in the continued refinement of the Site Conceptual Model. The HSC continues to submit quarterly soil vapor and groundwater monitoring reports in a timely manner. EPA, ADEQ and the HSC continue to meet on a quarterly basis to discuss issues related to the Site.

## Community Involvement Activities:

EPA distributes fact sheets and public notices to the nearby community which can be found on the ADEQ Web site. A fact sheet was distributed to residents and commercial businesses in the vicinity of the Site in January 2006 announcing the beginning of the second Five-Year Review. This fact sheet can be viewed on the ADEQ Web site at <http://www.azdeq.gov/envIRON/waste/sps/download/state/hassfact.pdf>. EPA held an Open House on January 11, 2006 for the community to come and learn about how the Five-Year Review was conducted.

## Site History:

**1961-1980:** Maricopa County began operating the Hassayampa Landfill as a municipal solid waste landfill in 1961. On February 15, 1979, The Arizona Department of Health Services (ADHS) prohibited the disposal of industrial and hazardous wastes into the City of Phoenix, 19<sup>th</sup> Avenue Landfill. Hazardous and industrial wastes were then transported to the Hassayampa Landfill under a manifest tracking system from approximately February 1979 to October 1980 when disposal ceased. The wastes were disposed in a series of excavated pits on a 10-acre property adjacent to the municipal solid waste (MSW) landfill. This 10-acre area later became the Hassayampa Superfund Site.

**1981-1987:** In December 1981, three on-site groundwater monitoring wells were constructed with ADHS funding. The first sampling in May 1982 indicated groundwater contamination by chlorinated solvents. The Site was subsequently scored by the EPA and placed on the National Priorities List (NPL) on July 22, 1987.

**1988:** EPA and certain Respondents entered into an administrative consent order on February 19, 1988 which required the Respondents to conduct a remedial investigation (RI) and feasibility study (FS) under EPA direction and oversight.

**1991-1992:** The RI and FS were completed in 1991 and 1992, respectively. Hazardous substances including volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) were detected in the soil and groundwater. EPA selected remedial actions in the Record of Decision (ROD) dated August 6, 1992.

**1994-1996:** Remedial actions were implemented at the Site including:

- A groundwater pump and treat system that began operation in March 1994;
- An engineered cap over the hazardous waste disposal areas to prevent direct contact with contaminated waste and soil left in place. This cap reduced infiltration of water, and reduced the release of VOC vapors to the atmosphere (constructed in June 1994);
- A soil vapor extraction system with thermal oxidation treatment to remove VOCs and semi-volatile organic compounds (SVOCs) from the vadose zone in areas where waste and soil contamination were a threat to groundwater (began operation in July 1996); and
- Access and deed restrictions.

Consent Decree CIV94-1821PHXRCB was signed in November 1994. The consent decree required all responsible parties to conduct soil and groundwater investigations, conduct a treatability study, conduct analytical modeling, cap construction, a groundwater pilot study, and remedial design and implementation of a remedy.

**1998:** The soil vapor extraction and treatment system was shut down for repairs in September. Subsequently, under the orders of the EPA, it was not restarted because of potential concerns that dioxins were produced by the thermal oxidation process.

**2000:** In November, EPA's contractor conducted the five-year review of the site remedies. The review found that the cap was in good condition, and the groundwater pump and treatment system was achieving hydraulic containment and removed a substantial mass of VOCs. The future operation of the soil vapor extraction system was deferred until additional data were obtained.

**2002:** In November, split effluent samples from the groundwater treatment system were collected by ADEQ and the responsible parties (RPs). The samples were analyzed for 1,4-dioxane. Test results were below laboratory detection limits.

**2005-2006:** Since 1998 and prior to March 2006, the Hassayampa Landfill Superfund Site remedy had only removed approximately 35 pounds of the contaminants of concern from the groundwater each year. Soil vapor sampling and analyses indicated increasing concentrations of VOCs. Operation of the groundwater pump and treat system was not addressing the concerns relating to the expanding soil vapor plume and off-site groundwater contamination. Two new ground water wells (MW-16UA and MW-17UA) and five soil vapor probes were installed and added to the monitoring network. Additionally, soil vapor samples from wells extending below the basalt layer were collected and analyzed. A baropneumatic test was conducted to evaluate the effect, if any, of the basalt layer on soil vapor migration.

ADEQ and EPA determined that the existing Site Conceptual Model (SCM) could no longer be supported by the current site conditions. EPA and ADEQ requested the HSC to develop a new SCM. In response to the changing conditions at the Site, the HSC hired a new project manager and subsequently selected a new "Supervising Contractor" (Geosyntec Consultants) which was approved by ADEQ and EPA in accordance with the requirements of the existing consent decree (CD).

ADEQ and EPA communicated to the HSC the need to provide a work plan to detail the work that will further evaluate the site conditions, update the SCM and address existing data gaps. The HSC submitted a Phase I work plan in July 2005. ADEQ and EPA provided comments on the work plan in September 2005. The parties met and the HSC was advised on how to finalize the work plan which involved installation of new soil vapor and groundwater monitoring wells above and beneath the basalt layer and re-starting of the SVE system with an updated off-gas treatment system.

The HSC conducted site-wide groundwater and soil vapor sampling in November 2005. Implementation of the approved Phase I Work Plan was initiated after January 1, 2006.

**2006:** Once the SVE system was restarted under the Phase I Work Plan, removal of VOC mass has increased dramatically. In January, EPA initiated the second Five-Year Review. The second

five-year review report was completed by the Environmental Protection Agency (EPA) in September which included a review of annual monitoring reports, a review of institutional controls, risk assessment studies, a Site inspection and interviews. The report stated that monitoring data from the period of approximately the late 1990's to early 2006 indicated upward trends in both the size and concentration of the vadose zone VOC vapor plume, prior to the re-start of the SVE system. VOC concentrations in several groundwater wells had also been increasing over the last few years prior to the re-start of the SVE system. The report also stated that VOC vapor concentrations beneath the basalt were found to be higher than above the basalt. The report concluded that the remedy is protective to human health and the environment in the short-term but further data collection is needed to determine if the remedy will be protective in the long-term.

### **Contaminants:**

The current contaminants of concern for groundwater include various volatile organic compounds (VOCs): 1,1-dichloroethene; trichlorotrifluoroethane; 1,1,1-trichloroethane; 1,1-dichloroethane; trichloroethene; tetrachloroethene; trichlorofluoromethane; 1,2-dichloroethene; 1,2-dichloropropane; and toluene. Soils beneath the waste pits contain VOCs, heavy metals, pesticides, and lime wastes. Contaminants of concern at the Site may change as new data becomes available.

### **Public Health Impacts:**

Risk assessment results indicate that potential health risks may exist for individuals who might ingest the contaminated groundwater or come into direct contact with hazardous wastes present. The landfill is capped, therefore, there is no potential for adverse health effects due to inhalation of VOCs in the air or direct contact with the hazardous wastes present below the ground surface. Contamination in the groundwater is contained within the Site boundaries. The groundwater contamination is restricted to the shallow aquifer which is not used as a potable water source.

### **Site Hydrogeology:**

The Site is located on the broad southward-sloping alluvial plain of the Hassayampa River basin. The basin is bounded on the east by the White Tank Mountains, on the south by the Buckeye Hills, and on the west by the Palo Verde Hills. The altitude of the land surface at the Site is approximately 910 to 915 feet above mean sea level.

Regional hydrogeologic units in the area of the Site include in order of increasing depth: recent alluvial deposits, basin-fill deposits, and the bedrock complex. Groundwater levels in the vicinity of the Site generally lie below the base of the recent alluvial deposits. However, where saturated, the recent alluvial deposits may yield moderate quantities of groundwater to wells. The thickness of the basin-fill deposits appears to exceed 1,200 feet in the vicinity of the landfill.

The basin-fill deposits comprise the principal source of groundwater to wells in the area of the Site, and are generally referred to as the regional aquifer. Within a three mile radius of the Site, 349 groundwater wells have been identified, 172 of which potentially service individual

residences. These wells yield groundwater from the regional basin-fill deposits aquifer. The reported depths range from five feet below land surface to 250 below land surface. The nearest downgradient domestic well is about 2,500 feet south of the Site. The basin-fill deposits have been classified in order of increasing depth into the upper, middle, and lower alluvium units. The upper alluvial unit (UAU) beneath the Site was subdivided in order of increasing depth into the upper alluvium deposits, basaltic lava flow unit, subunit A, and subunit B. The upper alluvium subunit consists of a coarse-grained part and a fine-grained part. The average depth to the base of the coarse-grained part is about 34 feet, while the average depth to the base of the fine-grained part is about 58 feet. The basaltic lava-flow consists of vesicular, basaltic rock and is part of the Arlington Mesa basalt flows. This subunit appears to thin and dip towards the north.

The presence of contaminated groundwater in subunit A indicates that the basaltic lava flow unit is not an impermeable unit. The part of the UAU from the base of the basaltic lava-flow subunit to the top of the middle alluvial unit (MAU) is the uppermost water bearing part of the regional aquifer.

The direction of groundwater flow in subunits A and B is generally to the south, although local variations in the flow direction may occur. The average depth to the water table beneath the Site is 73 feet below ground surface.

### **Contacts:**

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\*In Arizona, but outside the Phoenix area, call toll-free at (800) 234-5677.

\*\*Call EPA's toll-free message line at (800) 231-3075.

### **Information Repository:**

Interested parties can review site information at the information repository at the Buckeye Library located at 310 N. Sixth Street in Buckeye, (602) 386-2778. Site information is also available for review at the ADEQ main office located at 1110 W. Washington Street in Phoenix. With 24 hour notice, an appointment to review related documentation is available Monday through Friday from 8:30 a.m. to 4:30 p.m., at the ADEQ Records Management Center, 1110 W. Washington Street in Phoenix, Arizona. Please contact (602) 771-4380 or (800) 234-5677 to schedule an appointment to review these documents.